UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,053	12/02/2003	David C. Wittwer	884.B61US1	2614

21186 7590 04/16/2008

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
VUONG, QUOCHIEN B	

ART UNIT	PAPER NUMBER
2618	

MAIL DATE	DELIVERY MODE
04/16/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/726,053	WITTWER ET AL.	
	Examiner	Art Unit	
	Quochien B. Vuong	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _02 December 2003_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-30_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-10,17-19,22,23 and 25-30_ is/are rejected.

7)☒ Claim(s) _11-16,20,21 and 24_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _05 May 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 26 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 26 recites the limitation "the reactive power-dividers" in claim 26, line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Marchand (US 4,220,954).

Regarding claim 1, Marchand discloses a circuitry (figure 12) comprising: a hybrid (91) to combine signals from a pair of antennas and to provide a sum signal and a difference signal; and switching circuitry (92) to select between the sum

signal and the difference signal based on a signal quality of the sum and difference signals (column 9, lines 23-60).

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Bendov (US 7,295,254).

Regarding claim 1, Bendov discloses a circuitry (figure 3) comprising: a hybrid (7a) to combine signals from a pair of antennas and to provide a sum signal and a difference signal; and switching circuitry (5a) to select between the sum signal and the difference signal based on a signal quality of the sum and difference signals (see abstract and column 7, line 59 - column 8, line 47).

Regarding claim 25, Bendov discloses a wireless communication device (figure 3) comprising: a pair of substantially omnidirectional antennas (1a and 1b); a hybrid (7a) to receive signals from the pair of antennas and to provide a sum signal and a difference signal; and switching circuitry to select between either the sum signal or the difference signal based on a signal quality of the sum and difference signals (see abstract and column 7, line 59 - column 8, line 47).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bendov.

Regarding claim 2, Bendov discloses wherein the hybrid has a first antenna port (figure 3, item 7a1) to couple with a first of tile antennas, a second antenna port (7a2) to couple with a second of the antennas, and a first and a second switch port to provide respectively the sum signal and the difference signal (output 0^{o} or 180^{o}), and further if not inherent it would have been obvious for the circuitry of Bendov to include wherein a signal path between at least some of the ports is a compressed signal path having a plurality of 90-degree bends therein to reduce spacing between the at least some of the ports for a compact design of the circuitry.

9. Claims 3, 4 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marchand.

Regarding claims 3, Marchand (figure 8) discloses wherein the hybrid comprises reactive-power dividers associated with a first antenna port and a first switch port, wherein the hybrid is to provide substantially a predetermined phase difference between

the first antenna port and the first switch port, and it would be obvious for the circuitry of Marchand to include wherein the reactive power-dividers associated with the first antenna port and the first switch port are spaced closer than a physical distance associated with the predetermined phase difference in a stripline medium for compact design of the circuit.

Regarding claim 4, if not inherent it would be obvious for the circuitry of Marchand to include wherein the signal path between the reactive power-dividers comprises the plurality of 90-degree bends to reduce a distance between the reactive power-dividers to less than a distance associated with the predetermined phase difference for compact design of the circuitry.

Regarding claim 22, Machand discloses a hybrid (figure 8) comprising: four reactive power-dividers (52,53,56,57); and signal paths coupling the reactive power-dividers to provide a predetermined phase difference there between (column 5, lines 35-66), and if not inherent it would be obvious for the hybrid of Machand to include wherein the signal paths have a plurality of 90-degree bends therein to reduce a distance between the coupled reactive power-dividers to less than a distance associated with the predetermined phase difference for compact design.

10. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bendov in view of Carey (US 6,894,657).

Regarding claim 5, Bendov discloses wherein the hybrid is a 180-degree compact hybrid, wherein the sum signal comprises signals from the antennas combined

substantially in-phase, and wherein the difference signal comprises signals from the antennas combined substantially out-of-phase (column 7, line 59 - column 8, line 47). Bendov does not disclose wherein signal paths between ports of the hybrid comprise stripline. However, Carey discloses signal paths between ports of the hybrid comprise stripline (column 6, lines 38-44). Therefore, it would have been obvious to adapt the stripline of Carey to the circuitry of Bendov for compact design of the circuitry.

Regarding claim 23, Bendov discloses wherein the hybrid is a 180-degree hybrid (figure 12) and is to combine signals from a pair of antennas to provide a sum signal and a difference signal, wherein the hybrid further comprises: a first antenna port to couple with a first of the antennas; a second antenna port to couple with a second of the antennas; and first and second switch ports to provide, respectively, the sum signal and the difference signal, the sum signal comprising signals from the antennas combined substantially in-phase, the difference signal comprising signals from the antennas combined substantially out-of-phase column 7, line 59 - column 8, line 47). Bendov does not disclose the hybrid is fabricated in either a stripline or microstrip medium. However, Carey discloses a hybrid fabricated in a stripline (column 6, lines 38-44). Therefore, it would have been obvious to adapt the stripline medium of Carey to the hybrid of Bendov for compact design of the circuitry.

11. Claims 6, 17-19, and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bendov in view of Obuchi (US 6,741,293).

Regarding claim 6, Bendov disclose the circuitry of claim 1 above wherein

switching circuitry (5a) to select between the sum signal and the difference signal based on a signal quality of the sum and difference signals (see abstract and column 7, line 59 - column 8, line 47). Bendov does not specifically disclose the switching circuitry further comprises logic circuitry to compare a packet error rate between the sum and difference signals and to select one of the signals which has a lower packet error rate. However, the packet error rate is one form of the signal quality, and Obuchi disclose a switching circuitry for switching based on the packet error rate (see figures 1 and 2; column 7, lines 22-32; and column 8, lines 21-30). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the teaching of comparing the packet error rate for switching of Obuchi to the switching circuitry of Bendov as an alternative way of comparing the signal quality serving the same function to switch to a better signal.

Regarding claim 17, Bendov discloses a method comprising: generating a sum signal and a difference signal with a hybrid (figure 3, item 7a) from a pair of antennas; and selecting between the sum signal and the difference signal based on a signal quality of the sum and difference signals (see abstract and column 7, line 59 - column 8, line 47). Bendov does not specifically disclose selecting between the sum signal and the difference signal based on a packet error rate of the signals. However, the packet error rate is one form of the signal quality, and Obuchi disclose switching based on the packet error rate of the signal (see figures 1 and 2; column 7, lines 22-32; and column 8, lines 21-30). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the teaching of comparing the

packet error rate of the signal for switching of Obuchi to the method of Bendov as an alternative way of comparing the signal quality serving the same function to switch to a better signal.

Regarding claim 18, Bendov discloses wherein the generating comprises providing substantially a predetermined phase difference between a first antenna port and a first switch port of the hybrid (column 7, line 59 - column 8, line 47); and further if not inherent it would have been obvious for the method of Bendov to include wherein a signal path between reactive power-dividers associated with the ports comprises a plurality of 90-degree bends to reduce a distance between the reactive power-dividers to less than a distance associated with the predetermined phase difference for a compact design.

Regarding claim 19, Obuchi disclose measuring the packet error rate of the sum signal and the difference signal; comparing the measured packet error rates; and demodulating the selected signal (column 7, lines 22-32; and column 8, lines 21-30). Bendov and Obuchi do not disclose the signals comprise orthogonal frequency-division multiplexed (OFDM) signals comprising a plurality of orthogonal symbol-modulated subcarriers in a 5 GHz frequency spectrum or 2.4 GHz spectrum. However, the examiner takes Official notice that OFDM signal in 5 GHz frequency spectrum or 2.4 GHz spectrum are well know in the art in wireless local area network (WLAN) or short range radio frequency communication. Therefore, it would have been obvious for one of ordinary skill in the art to adapt the well know OFDM signal in 5 GHz frequency

spectrum or 2.4 GHz spectrum to the signals of Bendov and Obuchi so that the method can be used in WLAN or short range radio frequency environment.

Regarding claim 27, Bendov does not disclose wherein the signals comprise orthogonal frequency-division multiplexed signals comprising a plurality of symbol-modulated subcarriers in a predetermined frequency spectrum, the predetermined frequency spectrum comprising either a 5 GHz frequency spectrum or a 2.4 GHz frequency spectrum, and wherein the device further comprises transceiver circuitry to measure the packet error rate of the sum and difference signals, and to receive the selected signal from the switching circuitry for subsequent demodulation. However, the packet error rate is one form of the signal quality, and Obuchi disclose selecting a signal based on the packet error rate of the signal (see figures 1 and 2; column 7, lines 22-32; and column 8, lines 21-30). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the teaching of comparing the packet error rate for selecting a signal of Obuchi to the device of Bendov as an alternative way of comparing the signal quality serving the same function to select to a better signal. Bendov and Obuchi do not disclose the signals comprise orthogonal frequency-division multiplexed (OFDM) signals comprising a plurality of orthogonal symbol-modulated subcarriers in a 5 GHz frequency spectrum or 2.4 GHz spectrum. However, the examiner takes Official notice that OFDM signal in 5 GHz frequency spectrum or 2.4 GHz spectrum are well know in the art in wireless local area network (WLAN) or short range radio frequency communication. Therefore, it would have been obvious for one of ordinary skill in the art to adapt the well know OFDM signal in 5 GHz

frequency spectrum or 2.4 GHz spectrum to the signals of Bendov and Obuchi so that the circuitry can be used in WLAN or short range radio frequency environment.

Regarding claim 28, Bendov discloses an article comprising a storage medium having stored thereon instructions, that when executed by a computing platform, result in selecting between a sum signal and a difference signal based on a signal quality of the sum and difference signals (see abstract and column 7, line 59 - column 8, line 47), the sum signal and the difference signal being generated with a hybrid (figure 3, item 7a) from a pair of antennas (1a and 1b). Bendov does not specifically disclose selecting between a sum signal and a difference signal based on a packet error rate of the signals. However, the packet error rate is one form of the signal quality, and Obuchi disclose selecting a signal based on the packet error rate of the signal (see figures 1 and 2; column 7, lines 22-32; and column 8, lines 21-30). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the teaching of comparing the packet error rate for selecting a signal of Obuchi to the article of Bendov as an alternative way of comparing the signal quality serving the same function to select to a better signal.

As to claim 29, Bendov discloses wherein the instructions, when further executed by the computing platform result in further selecting between the sum signal and the difference signal, wherein the signals are generated by providing substantially a predetermined phase difference between at least some ports of the hybrid (column 7, line 59 - column 8, line 47), and if not inherent it would have been obvious for the article of Bendov and Obuchi to include wherein a signal path between

at least some of the ports is a compressed signal path having a plurality of 90-degree bends therein to reduce spacing between the at least some of the ports for a compact design of the circuitry.

As to claim 30, Obuchi discloses measuring the packet error rate of the sum signal and the difference signal; comparing the measured packet error rates; and demodulating the selected signal (column 7, lines 22-32; and column 8, lines 21-30). Bendov and Obuchi do not disclose the signals comprise orthogonal frequency-division multiplexed (OFDM) signals comprising a plurality of symbol-modulated subcarriers in a predetermined frequency spectrum, the predetermined frequency spectrum comprising either a 5 GHz frequency spectrum or a 2.4 GHz frequency spectrum. However, the examiner takes Official notice that OFDM signal in 5 GHz frequency spectrum or 2.4 GHz spectrum are well know in the art in wireless local area network (WLAN) or short range radio frequency communication. Therefore, it would have been obvious for one of ordinary skill in the art to adapt the well know OFDM signal in 5 GHz or 2.4 GHz spectrum to the signals of Bendov and Obuchi so that the circuitry can be used in WLAN or short range radio frequency environment.

12. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bendov in view of Obuchi and further in view of Peterson (US 5,493,720).

Regarding claim 7, Bendov and Obuchi disclose the circuitry of claim 6 above. In addition, Obuchi discloses the circuitry to measure the packet error rate of the sum and difference signals, and to receive the selected signal from the switching circuitry for

subsequent demodulation (column 7, lines 22-32; and column 8, lines 21-30). Bendov and Obuchi do not disclose a transceiver circuitry. However, Peterson discloses a transceiver circuitry with a hybrid (see figure 5, column 4, lines 5-7). Therefore, it would have been obvious to adapt the transceiver of Peterson to the circuitry of Bendov and Obuchi in order to provide two-way communication.

Regarding claims 8-10, Bendov, Obuchi, and Peterson do not disclose the signals comprise orthogonal frequency-division multiplexed (OFDM) signals comprising a plurality of orthogonal symbol-modulated subcarriers in a 5 GHz frequency spectrum, direct-sequence spread-spectrum (DSSS) modulated signals or complementary code keying-modulated (CCK) signals in a 2.4 GHz spectrum. However, the examiner takes Official notice that OFDM signal in 5 GHz frequency spectrum, DSSS, and CCK modulated signals in 2.4 GHz spectrum are well know in the art in wireless local area network (WLAN) or short range radio frequency communication. Therefore, it would have been obvious for one of ordinary skill in the art to adapt the well know OFDM signal in 5 GHz frequency spectrum, DSSS, and CCK modulated signals in 2.4 GHz spectrum to the signals of Bendov, Obuchi, and Peterson so that the circuitry can be used in WLAN or short range radio frequency environment.

13. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bendov in view of Marchand and Obuchi.

Regarding claim 26, Bendov discloses wherein the hybrid has a first antenna port to couple with a first of the antennas, a second antenna port to couple with a second

of the antennas, and a first and a second switch port to provide respectively the sum signal and the difference signal (column 7, line 66 - column 8, line 11). Bendov does not disclose wherein the hybrid has a reactive power-divider associated with the ports and is to provide a predetermined phase difference between the ports, wherein a signal path between the reactive power-dividers comprise 90-degree bends to reduce a distance between the reactive power-dividers to less than a distance associated with the predetermined phase difference, and wherein the switching circuitry further comprises logic circuitry to compare a packet error rate between the sum and difference signals and to select one of the signals having lower packet error rate. However, Machand discloses a hybrid (figure 8) comprising a reactive power-divider (52,53,56,57) associated with the ports and is to provide a predetermined phase difference between the ports (column 5, lines 35-66). Therefore, it would have been obvious to adapt the reactive power-divider of Marchand to the device of Bendov for providing the phase difference between the ports. Bendov and Marchand do not disclose wherein a signal path between the reactive power-dividers comprise 90-degree bends to reduce a distance between the reactive power-dividers to less than a distance associated with the predetermined phase difference, and wherein the switching circuitry further comprises logic circuitry to compare a packet error rate between the sum and difference signals and to select one of the signals having lower packet error rate. However, the packet error rate is one form of the signal quality, and Obuchi disclose switching based on the packet error rate of the signal (see figures 1 and 2; column 7, lines 22-32; and column 8, lines 21-30). Therefore, it would have been obvious for one having ordinary

skill in the art at the time the invention was made to adapt the teaching of comparing the packet error rate of the signal for switching of Obuchi to the method of Bendov as an alternative way of comparing the signal quality serving the same function to switch to a better signal, and further if not inherent it would be obvious for the hybrid of Bendov, Machand, and Obuchi to include wherein the signal paths have a plurality of 90-degree bends therein to reduce a distance between the coupled reactive power-dividers to less than a distance associated with the predetermined phase difference for compact design.

Allowable Subject Matter

14. Claims 11-16, 20, 21, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quochien B. Vuong whose telephone number is (571) 272-7902. The examiner can normally be reached on M-F 9:30-18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Nay Maung can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quochien B Vuong/
Primary Examiner, Art Unit 2618